ARI Research Note 90-67

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Labor Force Participation, Employment, and Earnings of Married Women: A Comparison of Military and Civilian Wives

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for

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July 1990

United States Army
Research Institute for the Behavioral and Social Sciences

U.S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency Under the Jurisdiction of the Deputy Chief of Staff for Personnel

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Technical review by

Arthur C. F. Gilbert

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION Unclassified	1b. RESTRICTIVE MARKINGS --
2a. SECURITY CLASSIFICATION AUTHORITY --	3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution is unlimited.
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE --	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) --	5. MONITORING ORGANIZATION REPORT NUMBER(S) ARI Research Note 90-67
6a. NAME OF PERFORMING ORGANIZATION Research Triangle Institute 6b. OFFICE SYMBOL (If applicable) --	7a. NAME OF MONITORING ORGANIZATION U.S. Army Research Institute for the Behavioral and Social Sciences
6c. ADDRESS (City, State, and ZIP Code) P.O. Box 12194 Research Triangle Park, NC 27709	7b. ADDRESS (City, State, and ZIP Code) 5001 Eisenhower Avenue Alexandria, VA 22333-5600
8a. NAME OF FUNDING/SPONSORING ORGANIZATION U.S. Army Research Institute for the Behavioral and Social Sciences 8b. OFFICE SYMBOL (If applicable) PERI-R	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER MDA903-87-C-0540
8c. ADDRESS (City, State, and ZIP Code) 5001 Eisenhower Avenue Alexandria, VA 22333-5600	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. 63731A; PROJECT NO. 792; TASK NO. 242; WORK UNIT ACCESSION NO. C2

11. TITLE (Include Security Classification)
Labor Force Participation, Employment, and Earnings of Married Women: A Comparison of Military and Civilian Wives

12. PERSONAL AUTHOR(S)
Schwartz, J. Brad (Research Triangle Institute)

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
Final	FROM 87/11 TO 88/03	1990, July	43

16. SUPPLEMENTARY NOTATION
Contracting Officer's Representative, D. Bruce Bell

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	Spouse employment, Salaries, Personnel Retention, Army families, Labor, Military/Civilian wives, CCP

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

The purpose of this research was to examine labor force participation, employment, and earnings of military and civilian wives to determine if there are significant differences in work outcomes for these women, and to examine the underlying factors that may be responsible for these differences. The March 1985 Current Population Survey data were used in the analyses. Military wives were found to be less likely to participate in the labor force than comparable civilian wives. The findings suggest that military wives do not earn significantly different wage rates or annual incomes compared to civilian wives after controlling for other individual and household differences. However, frequent relocations and being located away from large population centers do appear to negatively affect the earnings of military wives when compared to civilians.

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION Unclassified
22a. NAME OF RESPONSIBLE INDIVIDUAL Arthur C. F. Gilbert	22b. TELEPHONE (Include Area Code) (202) 274-8119 22c. OFFICE SYMBOL PERI-RP

DD Form 1473, JUN 86 *Previous editions are obsolete.* SECURITY CLASSIFICATION OF THIS PAGE

UNCLASSIFIED

LABOR FORCE PARTICIPATION, EMPLOYMENT, AND EARNINGS OF MARRIED WOMEN: A COMPARISON OF MILITARY AND CIVILIAN WIVES

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LABOR FORCE PARTICIPATION, EMPLOYMENT, AND EARNINGS OF MARRIED WOMEN: A COMPARISON OF MILITARY AND CIVILIAN SPOUSES

I. INTRODUCTION

Recent census data indicate that military wives have a higher unemployment rate and earn less than their civilian counterparts. Some researchers have suggested that employers may be reluctant to hire military wives and, if hired, pay them lower than market wages.[1] Wage and employment discrimination against military wives is an important issue for the military because of the relationship of spouse (wife) employment to personnel performance and retention. There is a concern that if being in the military limits a wife's ability to obtain satisfactory employment, then her husband may be less likely to perform well in his job and less likely to re-enlist. Due to the costs incurred from lower productivity and the replacement and retraining of personnel, there may be significant savings to the military from improved employment opportunities for the wives of military personnel.

While there is a large literature on female labor force participation and earnings, there have been few systematic studies which focus on the military wife.[2] The purpose of this study is to examine labor force participation, employment, and earnings of military and civilian wives to determine if there are significant differences in work outcomes for these women, and to examine the underlying factors that may be responsible for these differences. The results of the study have important policy implications for the military, both in terms of addressing the employment problems of military wives and ultimately for improving job performance and retention of military personnel.

The theoretical framework for the analysis is given in the following section. In the third section the estimation method and the data used in the study are described. The regression results are presented in the fourth section, and the final section summarizes the main findings and policy implications of the study.

II. THEORETICAL FRAMEWORK

The conceptual framework used for this study closely follows the economic model of married women's participation in the labor force, first developed by Mincer [17], and expanded by Becker [1] to include the family as the decision making unit. Within this context, there are unique factors that are likely to be related to differences in the work outcomes for military wives.

The household production model hypothesizes a utility maximizing household that decides whether the wife will be in the labor force based on her market wage rate relative to the value of her time spent at home, her reservation wage. If time spent working at a job away from home more than compensates her for time lost in home production then the couple will choose for her to work in the market labor force, all else equal. The outcome of the household utility maximization process is that the choice of whether the woman participates in the labor force is determined by her market wage, her reservation wage, and personal tastes and preferences.

Human capital theory suggests that education and experience are important determinants of the potential market wage (Schultz [12], Mincer [17], Becker [1]. The woman's number of years of education is expected to have a positive effect on wages and labor force participation. In the absence of complete work histories, the woman's age is often used as a proxy for experience, and its

squared value is also included in the analysis. A concave relationship between age and labor force participation is consistent with human capital theory and suggests that labor force participation increases with age up to some point, and then declines. A similar relationship between age and employment, and age and earnings, is also well established in the literature.[3] Because military wives generally are younger than civilian wives, it is expected that this factor contributes to lower labor force participation rates, higher unemployment, and lower wages than their civilian counterparts.

Wage rates have been shown to be negatively influenced by interruptions in work (Mincer and Ofek [9]). The frequency of interruptions may be a particularly important determinant of a military wife's wage rate because of the number of Permanent Change of Station (PCS) moves over the course of a military career. In addition, a change in location often requires an adjustment period and search time to find new employment, so it is expected that a move is negatively associated with labor force participation and employment.

The geographic location of the household is an important factor of labor market demand and is expected to be a determinant of work outcomes for married women. Poor labor demand conditions are likely to contribute to lower observed participation rates, employment, and earnings. Labor market demand may be a particularly important factor for military wives, since many military installations are located in relatively isolated areas. In general, women who are away from large population centers are likely to have lower participation rates (as discouraged workers), higher unemployment, and lower wages (Madden, [6]).

The wife's reservation wage, a measure of the value of her time spent in home production, is expected to be influenced by whether or not there are children in the household, and particularly by the age of the youngest child. A household which faces day care costs for pre-school aged children may find the

net income contributed by a working wife too small (perhaps even negative) for it to be worthwhile at the margin. These demographic factors for households with young children are expected to increase the reservation wage and decrease the likelihood that wives in these households will be in the labor force. The presence of pre-schoolers may also influence whether the woman is employed, as well. Women may be less likely to be employed if their work hours are constrained by available day care hours. With respect to wage rates, children may negatively influence a woman's earnings to the extent that she is willing to accept a lower paying job in order to accommodate day care hours, or perhaps to be more conveniently located to a day care center. Because military wives are younger than civilian wives, they are more likely to have younger aged children, and so this factor may also contribute to lower participation, employment, and earnings of military wives.

Other socioeconomic and demographic factors may have a direct effect on participation, employment, and earnings. For example, women with husbands who earn low incomes are expected to be more likely to be in the labor force, all else equal. The extent that military salaries are lower than civilian salaries for married men may contribute to higher labor force participation of military wives. A countervailling influence may be the benefits that families receive from having a husband in the military. The extent that non-cash benefits (e.g., free medical care) are greater than employer benefits in the civilian sector is expected to moderate the effect of lower military incomes. Other characteristics, including the ethnic background of the household and the civilian husband's occupation, may be useful as proxies for individual and household tastes and preferences for whether the wife is in the labor force.

III. EMPIRICAL METHODS AND DATA

Three models are separately estimated for married women: 1) labor force participation, 2) employment, and 3) earnings. The empirical approach for the model of labor force participation is to estimate a reduced-form labor supply model, including variables related to the wife's potential market wage and her reservation wage, plus a set of other socioeconomic and demographic factors. Variables that are positively correlated with the potential market wage (e.g., education and age) should increase the likelihood of labor force participation. Those that are positively correlated with the reservation wage (e.g., presence of young children) should decrease the likelihood of participation. Similar expectations hold for the model of whether the woman is employed.

The dependent variable for whether a married woman is in the labor force, and whether she is employed, is defined as a dichotomous variable. An appropriate statistical method for estimating the relationships for each model is the probit technique.[4] The following probit equation was estimated for the married women in the sample:

$$P_i = X_i \beta_i + \epsilon_i \qquad (1)$$

where: $P_i = 1$ if the woman was in the labor force, $P_i = 0$ if the woman was not in the labor force, β_i are the parameters to be estimated, ϵ_i is the error term, and X_i are the independent explanatory variables including age, education, ethnicity, husband's income, husband's occupation, household composition variables, change in location, current geographic location, and whether the woman's husband is in the military.

A similar probit equation is specified for whether the woman is employed. For those wives who are in the labor force, the model examines the determinants of the probability that they are employed.[5] Compared to the specification for

whether the wife is in the labor force, husband's income and occupation have been omitted, and the wife's occupation is included to control for differences in labor demand for various occupations.[6]

A two-step selectivity correction procedure (Heckman, [4]), with a probit equation as the first stage to predict whether the wife earns income, is used to examine the determinants of married women's earnings. The first stage probit equation is estimated for the full sample of married women, and is similar in form to Equation 1, with the exception that the dependent variable is defined as whether the woman is employed.[7] The fitted value of the probability of being employed from this equation is used to create a Mills Ratio, a measure of the bias introduced in the estimation of earnings because some the women were not employed and therefore had zero income. The Mills Ratio (λ_i) is computed for each individual i:

$$\lambda_i = f(Z_i)/F(Z_i) \qquad (2)$$

where: $f(Z_i)$ is the standard normal density function; $F(Z_i)$ is the cumulative distribution function, and Z_i is the fitted value of the probability of being employed computed from the coefficient estimates obtained from the probit equation.

The second stage of the procedure is an ordinary least squares (OLS) estimation of both hourly wages and annual income (for those women who earned income) and allows an analysis of whether being a military wife affects earnings, while controlling for other factors. Both hourly wages and annual income are examined because factors that are peculiar to the military household (e.g., frequent relocations) may have different effects on these earnings outcomes. The Mills Ratio is included as an independent explanatory variable in the OLS estimations of earnings and its estimated coefficient represents the normalized covariance between the error term in the probit equation and the error term of the income

equations. In effect, the Mills Ratio corrects for the potential selectivity bias introduced by the exclusion of women with zero income in the OLS estimations of income. Also included in the income estimations is a dummy variable indicating whether the woman has a military husband in order to test for differences in earnings between military and civilian wives which are not accounted for by other factors.

Data

The Current Population Survey (CPS) is well suited for the comparison and analysis of work outcomes for military and civilian wives. The universe is the civilian noninstitutional population of the U.S. and members of the military stationed in the U.S.[8] The March CPS file, also known as the Annual Demographic File, provides data on labor force status, employment status, occupation, and income, as well as individual and household characteristics.

A subset of the March 1985 CPS is used for the analysis of labor force participation, employment, and earnings of married women. Because the focus of this study is on the behavioral similarities and differences of women married to civilian men versus women married to military men, the sample is restricted to women who are between the ages of 16 and 45, with husbands who are full-time workers.[9] These selection criteria result in a sample population of 17,560 married women, of whom 17,010 have civilian husbands and 550 have husbands in the military.

Variable Definitions and Summary Statistics

The variables used in the analyses are listed and defined in Table 1. Means by civilian, military, and the full sample of married women are given in Table 2. Sample means and standard deviations, and means by sub-sample for each model are given in the Appendix.

[Tables 1 and 2 about here.]

The sample statistics given in Table 2 indicate that a lower proportion of military wives are in the labor force (52 percent) than civilian wives (67 percent). The average military wife is about 29 years old, considerably younger than the average civilian wife (about 33 years old). The proportion of military wives in each of the youngest child categories is larger than civilian wives and indicates that the children of military wives are generally younger than those of civilian wives. Military wives have about the same level of education (about 13 years) as civilian wives, and there is a larger proportion of black military wives (about 10 percent) than black civilian wives (about 5 percent). The average annual income of husbands (in thousands) is considerably less for the military ($19.88) relative to the civilian sample ($25.81). Over 79 percent of military wives had made a major move in location during the previous five year period compared to about 22 percent of civilian wives. The proportion of military wives living in large metropolitan areas (20%) and in central cities (16%) is less than the proportion of civilian wives in these areas (35% and 19%). In addition, military wives are more heavily concentrated in the South Atlantic region, and less heavily concentrated in the New England, Mid Atlantic, and East North Central regions.

Of married women in the labor force, about 85 percent of military wives are employed (15 percent unemployed) compared to an employment rate of about 95 percent for civilian wives (5 percent unemployed). The occupation of the women in the labor force also differs between military and civilians. There is a higher proportion of military wives in health, sales, and service occupations, and a lower proportion in professional, teaching, clerical, and manufacturing occupations.

For women who are employed, the average military wife earns $5.71 per hour and $6470 per year, compared to the average civilian wife who earns $6.07 per

hour and $8356 per year. Of these women, 46 percent of the military wives work full-time compared to 55 percent of civilian wives.

IV. RESULTS

The results of the probit estimations for labor force participation and employment including coefficient estimates, asymptotic t-statistics, and log likelihood ratios, are presented in Table 3. In general, the coefficients are interpreted in terms of the direction of change in the probability that the wife will be in each of the work-related outcome categories (i.e., in the labor force, or employed), given a change in each independent variable.

[Table 3 about here.]

Labor Force Participation

The coefficient estimate for having a husband in the military is found to be a statistically significant and negative factor of labor force participation. The result suggests that women who are married to men in the military are less likely to be in the labor force, all else equal. Several possible explanations for this result can be offered. One is related to the frequency of changes in location. A change in location in the previous five years is found to be a statistically significant and negative predictor of participation, but may not fully capture the higher likelihood that military wife has recently moved.[10] Because military wives change locations more frequently than civilian wives, they may be more likely to be temporarily out of the labor force setting up the household and getting adjusted to new surroundings before looking for a job at the new location.[11] Another possible explanation is that military wives may be more likely to be discouraged workers. That is, they may be less likely to find a job and, after some period of searching, they may simply stop looking for work

and drop out of the labor force. Yet another possible explanation is that military wives may be more likely than civilian wives to prefer home production additionally, perhaps participant in volunteer work competes with holding jobs for pay in the market labor force.

Other results from the estimation are basically in keeping with the findings of earlier studies of labor force participation of married women. Differences in the characteristics of military and civilian wives are seen to be responsible for countervailing influences on the likelihood that a military wife will participate in the labor force relative to a civilian wife. The results suggest, as expected, that older women, with more potential years of labor market experience, are more likely to participate, up to a point, and beyond the point, less likely. Because military wives are younger than civilian wives, this factor tends to decrease the probability that military wives participate in the labor force relative to civilian wives. In general, women with younger children, and therefore higher reservation wages, appear to be less likely to be in the labor force. Because military wives have relatively younger children than civilian wives, this factor also contributes to a lower likelihood that they participate.

Other characteristics of military wives tend to increase the likelihood that they participate in the labor force relative to civilian wives. The results suggest that wives who have husbands with high incomes are less likely to be in the labor force. The result is consistent with previous findings and suggests that households with a greater financial need are more likely to have the wife in the labor force. This factor tends to increase the relative probability of military wives being in the labor force because their husbands' salaries are lower than those of civilian husbands even though military benefits may be higher. The results also suggest that black married women are more likely to be in the labor force and, because there is a larger proportion of black military

wives than black civilian wives, this factor also contributes to a relatively higher likelihood of a military wife being in the labor force.

Employed versus Unemployed

Having a husband in the military is found to be a statistically significant and negative factor of whether the wife is employed. That is, after controlling for socioeconomic and demographic differences between military and civilian wives, military wives are still seen to have a lower probability of being employed than comparable civilian wives. This residual effect of being a military wife may be due, in part, to hiring discrimination. Employers may prefer civilian wives who are less likely to move out of the area. Another possible explanation is that because military wives move more frequently (and moving is found to be a statistically significant and negative factor affecting employment), they are probably more likely to be temporarily unemployed as a result of relocating.[12] The result also tends to support the suggestion that military wives are less likely to be in the labor force because they drop out as discouraged workers.

Other results of the estimation serve to identify characteristics of military wives that also lead to a relatively higher observed unemployment rate for these women. Because age is seen to positively influence employment, the result suggests that part of the reason that military wives are less likely to be employed is simply that they are relatively young. The presence of younger aged children of military wives tends to increase the reservation wage for these women, and this is also seen to be a negative factor of being employed.

On the other hand, the results suggest that some characteristics of military wives tend to be offsetting positive influences on the likelihood that a woman is employed. For example, women in health, sales, and service occupations are

more likely to be employed, and these are occupations where there is a larger proportion of military than civilian wives.

Wage Rates and Annual Income

Two dependent variable measures of earnings are estimated with OLS in semi-log form: 1) the log of the hourly wage rate and 2) the log of annual income. The results of the first stage probit estimation and the two earnings estimations are given in Table 4.

[Table 4 about here.]

The results of the probit estimation indicate that, regardless of whether or not a woman is in the labor force, being a military wife is a statistically significant and negative factor of being employed.[13] However, the results of the earnings estimations indicate that being a military wife is not a statistically significant determinant of hourly wages or annual income. The results suggest that there is no systematic wage discrimination against military wives. It appears that, while military wives are less likely to be employed, status as a military wife does not affect earnings once other background characteristics are taken into account.[14] Individual and household characteristics which directly affect earnings, and which differentiate military wives from civilian wives, are seen to be responsible for observed differences in hourly wages and annual income.

Interruptions in work appear to have a negative effect on annual income, but not on hourly earnings. A change in location is found to be a statistically significant and negative factor of annual income and, because military wives move more often than civilian wives, the results suggest that these interruptions are partially responsible for annual income differentials between the two groups. It is likely that a change in location causes some period of adjustment and time out of the labor force, which decreases annual income relative to that

earned by civilian wives. Hourly wage rates, on the other hand, do not appear to be significantly affected by changes in location. Other individual and household factors appear to be more important determinants of wage rates.

A location in a large metropolitan area and in a central city are found to be statistically significant and positive predictors of both hourly wages and annual income, suggesting that, because military wives are not located in these areas in the same proportion as civilian wives, military wives earn less than civilians, on average.

As expected, a woman's age is found to be a statistically significant and positive determinant of hourly wages and annual income. The results suggest that another reason military wives earn less than civilian wives is they are younger and have had fewer years available for work experience than civilian wives. In addition, the variables which control for the presence of children (under 18 years old) in the household are found to be negative determinants of wages and annual income and, in all but one case, are statistically significant. These results suggest that married women with children may be willing to accept lower paying jobs in order to accommodate day care and school schedules and, because a higher proportion of military wives have younger children than civilian wives, they earn less than civilian wives.

A larger proportion of military wives work part-time and, because working full-time is found to be a statistically significant and positive determinant of wages and annual income, this factor also leads to earnings for military wives which are lower than for comparable civilian wives.[15]

Simulations

Table 5 presents simulations performed using the probit estimates to obtain predicted probabilities of labor force participation and employment, and selectivity corrected OLS estimates to obtain fitted values for hourly wage rates and

annual income. Probabilities and earnings are estimated for hypothetical households having sample means for all independent variables, and then changes in these probabilities and earnings are determined which result from changes in independent variables.

[Table 5 about here.]

The independent variables chosen for the simulations are those which were found to be particularly relevant for military wives. The changes examined are whether the woman is married to a husband in the military, a decrease in the average age of the woman, whether a child under two years old is present in the household, whether the woman moved in the last five years, and whether the woman is located in a large metropolitan area.

If each married woman in the sample had a value for each independent variable set at its sample mean for each model, then the information presented in Table 5 indicates that approximately 71 percent of the women would be in the labor force, about 96 percent of those in the labor force would be employed, the women would earn $6.37 an hour, and $8853 per year. The simulation results indicate expected changes in these average (base) probabilities and earnings that would result from changes in the explanatory variables. The magnitude of changes are best evaluated relative to the base probabilities and earnings.

The simulation results indicate that women who are married to husbands in the military are .0769 less likely to be in the labor force and .0571 less likely to be employed. Relative to the base probability for women married to civilian husbands, being a military wife decreases the probability of being in the labor force by about 11 percent, and decreases the probability of being employed by about 6 percent. Having a husband in the military is not found to be a statistically significant factor of hourly earnings or annual income.

The average age of military wives is used to simulate the effect of younger age on the probability of being in the labor force, employed, and on earnings. The average age of military wives is 29.48 compared to the sample average of 32.84. The results indicate that the average aged military wife is slightly more likely (+.0091) to be in the labor force. The results indicate that the average age of military wives is near the peak of the concave labor force participation profile and that women who are older than this age are less likely to participate in the labor force.

The results also indicate that the average aged military wife is .0072 less likely to be employed. Relative to the base probability, younger average age decreases the probability of being employed by about .75 percent. In addition, the effect of younger average age decreases hourly earnings by about $.26, and decreases annual earnings by about $393. These results represent about a 4.1 percent decrease in average hourly wages and a 4.4 percent decrease in annual income due to younger average age.

The effect of having young children in the household is simulated by examining the change in probability of labor force participation, employment, and in earnings which results from having a child under two years old. The results indicate that women with children under two years old are .3785 less likely to be in the labor force than women without children in this age bracket. Relative to women without a child less than two years old, this represents a decrease of about 50 percent in the likelihood of being in the labor force. Women with children in this age group are also .0305 less likely to be employed, representing about a 3 percent decrease relative to women without children in the age group. Moreover, children under two years old are seen to decrease annual income by $1481 a year, or about 17 percent less than for women without children under two years old. The presence of children under two years old is not a statistically significant predictor of hourly wage rates.

The simulation results indicate that a woman who moved in the past five years is .0650 less likely to be in the labor force, and this represents about a 10 percent decrease in the likelihood relative to a woman who did not move. A woman who moved is seen to be .0191 less likely to be employed and relative to the base probability for a woman who did not move, this only represents about a 2 percent decline in the likelihood of being employed. The simulation results also indicate that a woman who moved would earn $468 per year less, or about 5 percent less than the average earnings of a woman who did not move. A move in the last five years is not found to be a statistically significant factor of hourly wage rates.

A woman who lives in a large metropolitan area is seen to earn $.85 per hour more, and $1117 per year more, than a woman who does not live in a large metropolitan area. Relative to the average earnings of women who do not live in these areas, these women earn about 12 percent more per hour, and about 16 percent more per year. Living in a large metropolitan area is not found to be a statistically significant predictor of labor force participation or employment.

V. SUMMARY AND POLICY IMPLICATIONS

Spouse employment is increasingly a concern for the military because of its relationship to performance and retention. This study examines the determinants of three work related outcomes for military wives: 1) labor force participation, 2) employment, and 3) income. The March 1985 Current Population Survey is used to create a unique data set of married women for the analysis. The estimation techniques allow an examination of the determinants of each work outcome and testing of whether having a husband in the military affects participation, employment, and earnings. Important results for policy making clearly emerge.

Military wives are found to be less likely to participate in the labor force than comparable civilian wives, perhaps because they drop out of the labor market as discouraged workers or because they change locations so frequently they are more likely to be temporarily out of the labor force. The results also suggest possible explanations of why military wives are observed to be more likely to be unemployed than comparable civilian wives. The relatively high unemployment rate of military wives may be related to the frequency of relocation and subsequent search time to find employment, and perhaps also to a reluctance on the part of employers to hire women who they expect to be temporary residents. Finally, the analysis of earnings suggests that military wives do not earn significantly different wage rates or annual incomes compared to civilian wives, after controlling for other individual and household differences. Wage discrimination does not appear to be a problem for military wives. However, frequent relocation and being located away from large population centers, both facts of military life, do appear to negatively affect the earnings of military wives when compared to civilians.

Other characteristics of military wives, which are significantly different from those of civilian wives, are seen to contribute to lower observed participation rates, higher unemployment rates, and lower earnings. In particular, younger ages and younger children of military wives appear to be major factors of observed work outcome differentials relative civilian wives.

Programs designed to identify job opportunities and placement of military wives, particularly following a relocation to a new area, are clearly suggested by the results of this study. In addition, a policy which decreases the number and frequency of relocations over the career of the military husband is also likely to improve spouse employment.

NOTES

1. For a review of the theory and empirical evidence which suggests that discrimination may be a problem for military wives, see Research Triangle Institute [10].

2. Grossman [3] and Schwartz, et al [13] are two examples.

3. Thorough reviews of the theory and empirical research of the human capital approach are given in Mincer [8] and Rosen [11].

4. For a complete description of the probit technique see Maddala [5].

5. The intent of this model is to examine the determinants of being employed for married women in households who desire that the woman works in the paid labor force. Thus, women who are not in the labor force are excluded from the model. It makes little conceptual sense to estimate the probability of a married woman being employed for those households who have decided that the wife is not in the labor force. Therefore, a selectivity correction to condition the model estimation on the likelihood that a woman is in the labor force is clearly inappropriate, because we are not interested in making inferences about the employability of women who have chosen not to work. However, the results of the model estimation are biased to the extent that some women are not in the labor force because they have dropped out after failing to find a job. We expect that the bias introduced by this factor is relatively small and does not seriously compromise the estimation results.

6. While husband income was found to affect labor force participation, there is no reason to expect that, once the woman enters the labor force, the husband's earnings will affect the likelihood that she is employed. Although the husband's occupation was included in the labor force participation model to control for tastes and preferences, the husband's occupation is omitted in the model of whether the woman is employed or unemployed.

7. Note that all women are included in the first stage of the estimation, regardless of whether or not they are in the labor force. For the estimation of earnings it is important to correct for potential selectivity bias because we only observe wages for those women who work, and a reason for not working (either unemployed or not in the labor force) may be that reservation wages are higher than wage offers. Unlike the model of whether a woman is employed, in this case it is crucial to control for differences in the characteristics of women who work and do not work.

8. Because the CPS sample only contains members of the Armed Forces stationed in the U.S., the analysis necessarily excludes military wives who are located outside of the U.S. In a separate analysis these wives are shown to have significantly different work outcomes due to limited employment opportunities overseas (Schwartz et al [13]).

9. In order to provide additional measures of comparability, the age restriction is imposed to capture the sample of military wives and similarly aged

civilian wives and, because military personnel can safely be assumed to be full-time workers, civilian wives with husbands who do not work full-time are excluded from the analysis. It is expected that the work outcomes for women who fall outside of these parameters would be significantly different than for the population examined.

10. The March 1985 CPS data, unlike previous CPS samples, does not contain data on whether the household moved in the previous year, a variable that may have been preferred to whether the household moved in the previous five year interval. However, the variable used in these analyses serves as a good proxy for whether the woman is likely to be a frequent or infrequent mover. The variable has been constructed to reflect moves that were likely to cause an interruption in work, e.g., a move from a different noncontiguous state.

11. Based on DoD data, the average length of time spent in one location for a military wife in 1985 was less than 24 months. See Griffith, et al [2] and Schwartz, et al [13].

12. Another possible explanation is that sufficient controls for labor market demand conditions have not been fully captured by the wife's occupation and geographic location variables.

13. The results are consistent with the previous result found in the estimation of whether a woman in the labor force is employed.

14. The selectivity variable (MILLS) is a statistically significant factor in the estimation of hourly wages, and corrects for the bias introduced from not observing wages for women who do not work. The correction variable is statistically insignificant in the estimation of annual income, and suggests that there is no selectivity bias present. The statistically significant and negative Mill's coefficient in the hourly wage estimation indicates the presence of a negative covariance between the error terms of hourly wage rates and the probit model which, if the Mill's ratio was not included in the estimation, would lead to an under prediction of hourly wage rates.

15. In a separate analysis a probit estimation was performed to examine whether being a military wife affects the likelihood of working full-time or part-time. The coefficient estimate for having a husband in the military was found to be a statistically insignificant determinant in the model. Other individual and household characteristics appear to account for a higher probability that a military wife works part-time.

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Table 1

Variable Names and Definitions

Dependent Variables:	
Labor Force Participation	Dichotomous variable set equal to 1 if woman is in the labor force and zero otherwise, for all women.
Employed	Dichotomous variable set equal to 1 if woman is employed and zero if woman is unemployed, for women in the labor force.
Earns Income	Dichotomous variable set equal to 1 if woman works for pay and zero otherwise, for all women.
Log Hourly Wage	Log of woman's hourly wage.
Log Annual Income	Log of woman's annual earnings.
Independent Variables:	
Husband in Military	Whether husband is in the military, dummy variable (1=yes, 0=no).
Age	Wife's age, in years.
Age Squared	Wife's age, Squared.
Education	Wife's education, years of formal schooling completed.
Black	Wife's race is black, dummy variable (1=yes, 0=no).
Hispanic	Wife's ethnicity is Hispanic, dummy variable (1=yes, 0=no).
Husband's Earnings	Husband's annual income, in thousands.
Husband in Professional Occupation	Husband occupation-professional, dummy variable (1=yes, 0=no).
Husband in Tech/Sales Occupation	Husband occupation-tech,sales,clerical, dummy variable (1=yes, 0=no).
Husband in Service Occupation	Husband occupation-services, dummy variable (1=yes, 0=no).

Table 1 (Continued)

Variable Names and Definitions

Husband in Laborer Occupation	Husband occupation-laborer, dummy variable (1=yes, 0=no).
Husband in Other Occupation	Husband occupation-agriculture and other, excluded category.
Managerial Occupation	Wife's occupation-administrator/manager, dummy variable (1=yes, 0=no).
Professional Occupation	Wife's occupation-professional, dummy variable (1=yes, 0=no).
Health-Related Occupation	Wife's occupation-health assistant, dummy variable (1=yes, 0=no).
Teaching Occupation	Wife's occupation-teacher, except post-secondary, dummy variable (1=yes, 0=no).
Technician Occupation	Wife's occupation-technician, dummy variable (1=yes, 0=no).
Sales Occupation	Wife's occupation-sales, dummy variable (1=yes, 0=no).
Clerical Occupation	Wife's occupation-clerical, dummy variable (1=yes, 0=no).
Service Occupation	Wife's occupation-services, dummy variable (1=yes, 0=no).
Manufacturing Occupation	Wife's occupation-manufacturing, dummy variable (1=yes, 0=no).
Other Occupation	Wife's occupation-other (also includes 27 women with no work experience), omitted category.
Full Time	Wife is full-time worker, dummy variable (1=yes, 0=no).
Self-Employed	Wife is self-employed, dummy variable (1=yes, 0=no).
Part Time and Self-Employed	Wife is part-time and self-employed, dummy variable (1=yes, 0=no).

Table 1 (Continued)

Variable Names and Definitions

No Children, Young	No children and wife is age 29 or younger, excluded category.
Youngest Child Age 0-2	Youngest child is age 0-2, dummy variable (1=yes, 0=no).
Youngest Child Age 3-5	Youngest child is age 3-5, dummy variable (1=yes, 0=no).
Youngest Child Age 6-11	Youngest child is age 6-11, dummy variable (1=yes, 0=no).
Youngest Child Age 12-17	Youngest child is age 12-17, dummy variable (1=yes, 0=no).
Youngest Child Age 18+	Youngest child is age 18+, or no children and wife is age 30 or older, dummy variable, (1=yes, 0=no).
Number of Families in Household	Number of families in the household.
Moved in Past 5 Years	Whether the wife made a major move in location in the last five yeârs, dummy variable (1=yes, 0=no).
Central City	Whether the household is located in a central city area, dummy variable (1=yes, 0=no).
Metropolitan Area	Whether the household is located in one of the largest fifty-seven U.S. metropolitan areas, dummy variable (1=yes, 0=no).
New England Region	New England region, dummy variable (1=yes, 0=no).
Mid-Atlantic Region	Mid-Atlantic region, dummy variable (1=yes, 0=no).
East North Central Region	East North Central region, dummy variable (1=yes, 0=no).
West North Central Region	West North Central region, dummy variable (1=yes, 0=no).

Table 1 (Continued)

Variable Names and Definitions

South Atlantic Region	South Atlantic region, dummy variable (1=yes, 0=no).
East South Central Region	East South Central region, dummy variable (1=yes, 0=no).
West South Central Region	West South Central region, dummy variable (1=yes, 0=no).
Mountain Region	Mountain region, dummy variable (1=yes, 0=no).
Pacific Region	Pacific region, omitted category.
Mills Ratio	Selectivity correction variable.

Table 2

Sample Means by Military and Civilian Wives

Variable	Military	Civilian	All
LFP Model:	(N=550)	(N=17010)	(N=17560)
Labor Force Participation	0.5200	0.6700	0.6653
Husband in Military	----	----	0.0313
Age	29.4782	32.9497	32.8409
Age Squared	911.0818	1131.4655	1124.5628
Education (Yrs)	13.0018	12.8565	12.8610
Black	0.0964	0.0528	0.0542
Hispanic	0.0745	0.0974	0.0966
Husband's Earnings	19.8805	25.8122	25.6264
Number of Families in HH	1.0327	1.0396	1.0394
Husband in Prof Occupation	0.0000	0.2859	0.2770
Husband in Tech/Sales Occ	0.0000	0.1914	0.1854
Husband in Service Occ	0.0000	0.0657	0.0637
Husband in Labor Occ	0.0000	0.4240	0.4108
Youngest Child Age 0-2	0.3400	0.2531	0.2559
Youngest Child Age 3-5	0.1545	0.1542	0.1542
Youngest Child Age 6-11	0.1745	0.2061	0.2051
Youngest Child Age 12-17	0.0855	0.1490	0.1470
Youngest Child Age 18+	0.0673	0.1276	0.1257
Moved in Past 5 Years	0.7945	0.2171	0.2352
New England Region	0.0345	0.0806	0.0792
Mid-Atlantic Region	0.0182	0.1321	0.1285
East North Central Region	0.0582	0.1423	0.1396
West North Central Region	0.0873	0.1017	0.1013
South Atlantic Region	0.2527	0.1495	0.1527
East South Central Region	0.0400	0.0503	0.0500
West South Central Region	0.0764	0.0996	0.0989
Mountain Region	0.0964	0.1032	0.1030
Metropolitan Area	0.2036	0.3526	0.3480
Central City	0.1564	0.1868	0.1858

Table 2 (Continued)

Sample Means by Military and Civilian Wives

Variable	Military	Civilian	All
Employment Model:	(N=286)	(N=11397)	(N=11683)
Employed and in the Labor Force	0.8497	0.9481	0.9457
Managerial Occupation	0.0769	0.0854	0.0852
Professional Occupation	0.0315	0.0660	0.0651
Health-Related Occupation	0.0559	0.0428	0.0431
Teaching Occupation	0.0385	0.0752	0.0743
Technician Occupation	0.0420	0.0379	0.0380
Sales Occupation	0.1678	0.1133	0.1146
Clerical Occupation	0.2937	0.3080	0.3076
Service Occupation	0.1958	0.1395	0.1409
Manufacturing Occupation	0.0420	0.0906	0.0894
Earnings Models:	(N=207)	(N=9810)	(N=10017)
Wife's Hourly Wage	5.7125	6.0733	6.0657
Wife's Annual Income	6470.10	8355.93	8311.88
Full Time	0.4638	0.5545	0.5527
Self-Employed	0.0242	0.0276	0.0276
Part Time and Self-Employed	0.0193	0.0163	0.0164

Table 3

Probit Estimation Results For Labor Force Participation (LFP) and Employment (Employed) (t-statistics)

Independent Variable	LFP	Employed
Intercept	-1.0584 *** (-4.1799)	-0.8875 * (-1.9537)
Husband in Military	-0.2133 *** (-2.6387)	-0.4635 *** (-4.5748)
Age	0.0798 *** (5.1559)	0.0932 *** (3.1763)
Age Squared	-0.0014 *** (-6.0646)	-0.0011 ** (-2.5164)
Education	0.1061 *** (21.3824)	0.0496 *** (4.7341)
Black	0.3043 *** (6.1335)	-0.2559 *** (-3.3611)
Hispanic	-0.0097 (-0.2561)	-0.0826 (-1.1332)
Husband's Earnings	-0.0129 *** (-18.0648)	----
Number of Families in Household	-0.1490 *** (-3.2436)	----
Husband in Professional Occupation	0.2693 *** (4.3327)	----
Husband Tech/Sales Occupation	0.3079 *** (4.9428)	----
Husband in Service Occupation	0.2687 *** (3.8349)	----
Husband in Labor Occupation	0.1804 *** (3.0725)	----
Managerial Occupation	----	0.5161 *** (4.8182)
Professional Occupation	----	0.5868 *** (4.6096)

Table 3 (Continued)

Probit Estimation Results For Labor Force Participation (LFP) and Employment (Employed) (t-statistics)

Independent Variable	LFP	Employed
Health-Related Occupation	----	0.8096 *** (5.0867)
Teaching Occupation	----	0.7810 *** (5.5534)
Technician Occupation	----	0.4305 *** (3.3572)
Sales Occupation	----	0.3986 (4.3079)***
Clerical Occupation	----	0.5747 (6.8311)***
Service Occupation	----	0.4378 *** (4.9516)
Manufacturing Occupation	----	0.0723 (0.8086)
Youngest Child Age 0-2	-1.0308 *** (-23.9951)	-0.3053 *** (-4.2048)
Youngest Child Age 3-5	-0.7770 *** (-15.8815)	-0.3188 *** (-3.7565)
Youngest Child Age 6-11	-.4299 *** (-8.3251)	-0.3310 *** (-3.7162)
Youngest Child Age 12-17	-0.1518 *** (-2.6301)	-0.3120 *** (-3.0569)
Youngest Child 18+	-0.0279 (-0.4759)	-0.2808 *** (-2.7843).
Moved in Past 5 Years	-0.1846 *** (-7.1841)	-0.2041 *** (-4.2557)
New England Region	0.0238 (0.5019)	0.0559 (0.5857)

Table 3 (Continued)

Probit Estimation Results For Labor Force Participation (LFP) and Employment (Employed) (t-statistics)

Independent Variable	LFP	Employed
Mid-Atlantic Region	-0.2104 ***	-0.1078
	(-5.3423)	(-1.3448)
East North Cen Region	-0.0778 **	-0.1605 **
	(-1.9918)	(-2.1087)
West North Cen Region	0.1229 ***	0.0964
	(2.7878)	(1.0946)
South Atlantic Region	0.0020	0.0566
	(0.0503)	(0.7345)
East South Cen Region	-0.2071 ***	-0.1605
	(-3.8152)	(-1.5849)
West South Cen Region	-0.0403	-0.0609
	(-0.9402)	(-0.7311)
Mountain Region	-0.0840 *	0.0027
	(-1.9480)	(0.0318)
Metropolitan Area	-0.0377	0.0272
	(-1.5353)	(0.5628)
Central City	-0.0427	0.0963 *
	(-1.5240)	(1.7167)

*** t-statistic significant at .01 level
** t-statistic significant at .05 level
* t-statistic significant at .10 level

(-2.0) Times Log Likelihood Ratio (distributed Chi-square):

	2325.92 (28 d.f.)	393.93 (31 d.f.)
PROB > χ^2	.0001	.0001
Observations:		
Dep Variable=0	5877	634
Dep Variable=1	11683	11049
Total	17560	11683

Table 4

Prcbit Selectivity and OLS Earnings Estimation Results
(t-statistics)

Independent Variable	Earns Income	Log of Hourly Wage	Log of Annual Income
Intercept	0.1343 (0.525)	-0.4503 ** (-2.265)	6.0669 *** (24.329)
Husband in Military	-0.1806 ** (-2.227)	-0.0395 (-0.719)	-0.1029 (-1.494)
Age	0.0204 (1.310)	0.0905 *** (7.343)	0.1018 *** (6.591)
Age Squared	-0.0007 *** (-2.932)	-0.0013 *** (-7.007)	-0.0014 *** (-6.232)
Education	0.0982 *** (19.878)	0.0478 *** (10.020)	0.0460 *** (7.687)
Black	0.3248 *** (6.478)	0.0546 * (1.658)	0.1009 ** (2.445)
Hispanic	-0.0074 (-0.196)	-0.0244 (-0.811)	0.0259 (0.687)
Husband's Earnings	-0.0116 *** (-16.056)	----	----
Number of Families in HH	-0.1450 *** (-3.126)	----	----
Husband in Prof. Occupation	0.2528 *** (4.079)	----	----
Husband in Tech/ Sales Occupation	0.2697 *** (4.342)	----	----
Husband in Service Occupation	0.2978 *** (4.248)	----	----
Husband in Labor Occupation	0.2139 *** (3.652)	----	----
Full Time	----	0.1534 *** (9.470)	1.0623 *** (52.296)

Table 4 (Continued)

Probit Selectivity and OLS Earnings Estimation Results
(t-statistics)

Independent Variable	Earns Income	Log of Hourly Wage	Log of Annual Income
Self-Employed	----	-0.4631 ***	-0.3921 ***
		(-6.435)	(-4.345)
Part Time and Self-Employed	----	-0.1897 **	-0.2482 **
		(-2.031)	(-2.118)
Managerial Occupation	----	0.3521 ***	0.4556 ***
		(7.090)	(7.314)
Professional Occupation	----	0.3974 ***	0.4312 ***
		(7.479)	(6.471)
Health Occupation	----	0.5788 ***	0.6972 ***
		(10.403)	(9.992)
Teaching Occupation	----	0.2921 ***	0.3085 ***
		(5.548)	(4.674)
Technician Occupation	----	0.4260 ***	0.5042 ***
		(7.583)	(7.158)
Sales Occupation	----	0.0343	0.0313
		(0.721)	(0.524)
Clerical Occupation	----	0.1845 ***	0.2268 ***
		(4.215)	(4.130)
Service Occupation	----	-0.0766	-0.1732 ***
		(-1.639)	(-2.957)
Manufacturing Occupation	----	0.1523 ***	0.3061 ***
		(3.116)	(4.993)
Youngest Child Age 0-2	-0.9658 ***	-0.0433	-0.1601 ***
	(-21.158)	(-1.398)	(-4.124)
Youngest Child Age 3-5	-0.8271 ***	-0.0902 ***	-0.2203 ***
	(-16.119)	(-2.662)	(-5.185)

Table 4 (Continued)

Probit Selectivity and OLS Earnings Estimation Results
(t-statistics)

Independent Variable	Earns Income	Log of Hourly Wage	Log of Annual Income
Youngest Child Age 6-11	-0.4905 ***	-0.1332 ***	-0.2523 ***
	(-9.118)	(-3.899)	(-5.889)
Youngest Child Age 12-17	-0.2188 ***	-0.1014 ***	-0.1609 ***
	(-3.683)	(-2.637)	(-3.337)
Youngest Child 18 or Over	-0.1028 *	0.0089	-0.0458
	(-1.711)	(0.240)	(-0.991)
Moved in Past 5 Years	-0.0796 ***	-0.0288	-0.0529 **
	(-3.067)	(-1.488)	(-2.177)
New England Region	0.0835 *	-0.0817 **	-0.1038 **
	(1.764)	(-2.428)	(-2.458)
Mid-Atlantic Region	-0.1160 ***	-0.1572 ***	-0.1887 ***
	(-2.953)	(-5.267)	(-5.042)
East North Central	-0.0194	-0.1305 ***	-0.1486 ***
	(-0.498)	(-4.513)	(-4.095)
West North Central	0.1247 ***	-0.2201 ***	-0.1867 ***
	(2.842)	(-7.029)	(-4.755)
South Atlantic Region	0.0539	-0.1517 ***	-0.1293 ***
	(1.387)	(-5.355)	(-3.641)
East South Central	-0.1492 ***	-0.2275 ***	-0.2109 ***
	(-2.742)	(-5.417)	(-4.005)
West South Central	-0.0026	-0.1732 ***	-0.1444 ***
	(-0.603)	(-5.318)	(-3.534)
Mountain Region	-0.0250	-0.1141 ***	-0.0915 **
	(-0.580)	(-3.515)	(-2.247)

Table 4 (Continued)

Probit Selectivity and OLS Earnings Estimation Results
(t-Statistics)

Independent Variable	Earns Income	Log of Hourly Wage	Log of Annual Income
Metropolitan Area	-0.0329 (-1.340)	0.1291 *** (7.271)	0.1242 *** (5.579)
Central City	-0.0550 ** (-1.964)	0.0502 ** (2.467)	0.0759 *** (2.977)
Mills Ratio	----	-0.0644 *** (-2.662)	0.0126 (0.415)

*** t-statistic significant at .01 level
** t-statistic significant at .05 level
* t-statistic significant at .10 level

(-2.0) Times Log Likelihood Ratio (distributed Chi-square):
1910.42 (28 d.f.)

PROB > χ^2	.0001		
F		58.863 (35 d.f.)	153.783 (35 d.f.)
PROB > F		.0001	.0001
Adjusted R-square		0.1534	0.3481
Observations:			
Dep Variable=0	5564		
Dep Variable=1	11996		
Total	17560	10017	10017

Table 5

Simulation Results

	LFP	Employed	Hourly Wage	Annual Income
Base Probability and Earnings	.7073	.9609	$6.37	$8853
Simulated Changes:				
Husband in the Military	-.0769*	-.0571*	-$0.18	-$884
Average Age of Military Spouse (29.48 years)	+.0091*	-.0072*	-$0.26*	-$393*
Child under 2 years old	-.3785*	-.0305*	+0.28	-$1481*
Moved in the last five years	-.0650*	-.0191*	-$0.16	-$468*
Live in large metropolitan area	-.0130	+.0023	+$0.85*	+$1117*

*Coefficient estimate is statistically significant at the .10 level, or better.

APPENDIX A

ADDITIONAL TABLE

Table A-1

Labor Force Participation Model Means

Variable	Not In Labor Force	In Labor Force	All
Age	32.5052	33.0098	32.8409
Age Squared	1103.3924	1135.2124	1124.5628
Education	12.2978	13.1444	12.8610
Black	0.0376	0.0625	0.0542
Hispanic	0.1263	0.0817	0.0966
Hus Earnings	27.4621	24.7030	25.6264
No. Families in HH	1.0473	1.0354	1.0394
Hus in Prof Occupation	0.2564	0.2873	0.2770
Hus Tech/Sales Occ	0.1581	0.1991	0.1854
Hus in Service Occ	0.0596	0.0657	0.0637
Hus in Labor Occ	0.4429	0.3946	0.4108
Young Child Age 0-2	0.3762	0.1953	0.2559
Young Child Age 3-5	0.1882	0.1371	0.1542
Young Child Age 6-11	0.1945	0.2105	0.2051
Young Child Age 12-17	0.1154	0.1629	0.1470
Young Child 18+	0.0778	0.1499	0.1257
Moved in Past 5 Years	0.2643	0.2206	0.2352
New England Region	0.0689	0.0843	0.0792
Mid-Atlantic Region	0.1451	0.1202	0.1285
East North Cen Region	0.1409	0.1390	0.1396
West North Cen Region	0.0830	0.1104	0.1013
South Atlantic Region	0.1375	0.1604	0.1527
East South Cen Region	0.0556	0.0472	0.0500
West South Cen Region	0.1045	0.0960	0.0989
Mountain Region	0.1101	0.0995	0.1030
Husband in Military	0.0449	0.0245	0.0313
Metropolitan Area	0.3611	0.3414	0.3479
Central City	0.1921	0.1827	0.1858

Table A-2

Employment Model Means

Variable	In Labor Force, Not Employed	In Labor Force, Employed	All
Age	31.1640	33.1158	33.0098
Age Squared	1022.4637	1141.6820	1135.2124
Education	12.0158	13.2092	13.1444
Black	0.1041	0.0601	0.0625
Hispanic	0.1262	0.0792	0.0817
Managerial Occ	0.0599	0.0866	0.0852
Professional Occ	0.0315	0.0671	0.0651
Health Occ	0.0142	0.0448	0.0431
Teaching Occ	0.0205	0.0774	0.0743
Technician Occ	0.0347	0.0382	0.0380
Sales Occ	0.1356	0.1134	0.1146
Clerical Occ	0.2224	0.3125	0.3076
Service Occ	0.1656	0.1395	0.1409
Manufacturing Occ	0.2066	0.0827	0.0894
Young Child Age 0-2	0.2508	0.1921	0.1953
Young Child Age 3-5	0.1609	0.1358	0.1371
Young Child Age 6-11	0.2066	0.2107	0.2105
Young Child Age 12-17	0.1388	0.1643	0.1629
Young Child 18+	0.1151	0.1519	0.1499
Moved in Past 5 Years	0.3028	0.2159	0.2206
New England Region	0.0647	0.0854	0.0843
Mid-Atlantic Region	0.1167	0.1204	0.1202
East North Cen Region	0.1577	0.1379	0.1390
West North Cen Region	0.0820	0.1120	0.1104
South Atlantic Region	0.1498	0.1610	0.1604
East South Cen Region	0.0757	0.0455	0.0472
West South Cen Region	0.1120	0.0951	0.0960
Mountain Region	0.0946	0.0997	0.0995
Husband in Military	0.0678	0.0220	0.0245
Metropolitan Area	0.3076	0.3433	0.3414
Central City	0.1656	0.1836	0.1827

Table A-3

Earnings Models Summary Statistics

Variable	Mean (N=10017)	Standard Deviation
Age	33.0263	6.7027
Age Squared	1135.6546	443.5213
Education	13.2396	2.3807
Black	0.0643	0.2453
Hispanic	0.0792	0.2700
Full Time	0.5527	0.4972
Self-Employed	0.0276	0.1637
Part Time & Self-Employed	0.0164	0.1269
Managerial Occupation	0.0879	0.2831
Professional Occupation	0.0666	0.2493
Health Occupation	0.0479	0.2136
Teaching Occupation	0.0801	0.2714
Technician Occupation	0.0413	0.1991
Sales Occupation	0.1075	0.3098
Clerical Occupation	0.3260	0.4688
Service Occupation	0.1231	0.3286
Manufacturing Occupation	0.0868	0.2815
Youngest Child Age 0-2	0.1871	0.3900
Youngest Child Age 3-5	0.1328	0.3393
Youngest Child Age 6-11	0.2087	0.4064
Youngest Child Age 12-17	0.1643	0.3706
Youngest Child 18+	0.1538	0.3608
Moved in Past 5 Years	0.2157	0.4114
New England Region	0.0869	0.2816
Mid-Atlantic Region	0.1222	0.3275
Eastern North Central Region	0.1404	0.3474
Western North Central Region	0.1113	0.3145
South Atlantic Region	0.1640	0.3703
Eastern South Central Region	0.0453	0.2080
Western South Central Region	0.0922	0.2894
Mountain Region	0.0971	0.2962
Metropolitan Area	0.3476	0.4762
Central City	0.1856	0.3888
Husband in Military	0.0207	0.1423
Mills Ratio	0.7093	0.4582